

Changkat Changi Secondary School
Physics Department
Secondary 3 Express

Name: _____ () Class: _____ Date: _____

TOPIC : FORCES & PRESSURE (Unit 3 / Textbook Page 46 – 67)

WORKSHEET 3B.3

24

A. MULTIPLE CHOICE QUESTIONS [9 marks]

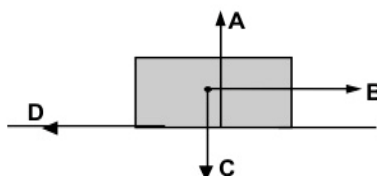
1. An object, of mass 3 kg, is accelerated at 2 ms^{-2} as a result of a force applied. What is the magnitude of the force?
A 1.5N **B** 2N **C** 3N **D** 6N
 ()

2. A body with a mass of 10kg is placed on a frictionless surface. It is pulled by a spring balance and its acceleration is 5 ms^{-2} . What should the reading on the spring balance be?
A 10N **B** 50N **C** 500N **D** 15N
 ()

3. A force is applied to an object on a frictionless surface. It produces an acceleration of 3 ms^{-2} . Which are possible values for the applied force and the mass of the object?
- | | Force/N | Mass/kg | | Force/N | Mass/kg |
|----------|---------|---------|----------|---------|---------|
| A | 2 | 5 | C | 5 | 2 |
| B | 2 | 6 | D | 6 | 2 |
- ()

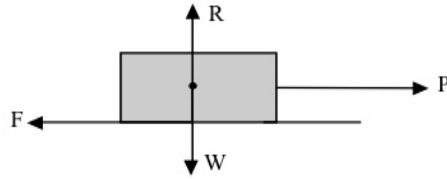
4. A force is applied to an object on a frictionless surface. It produces an acceleration of 5 ms^{-2} . What are possible values for the applied force and for the mass of the object?
- | | Force/N | Mass/kg |
|----------|---------|---------|
| A | 10 | 3 |
| B | 15 | 5 |
| C | 15 | 3 |
| D | 10 | 5 |
- ()

5. The diagram below shows a block of wood at rest on a horizontal surface.



Which arrow represents the block's weight? ()

6. A concrete slab is being pulled across a horizontal surface and it is known that the forces are balanced. The forces acting on the slab are indicated on the diagram as shown.



P – Pull on the slab

W – Weight of the object

F – Frictional Force

R – Normal reaction/contact force

Which one of the following statements is true?

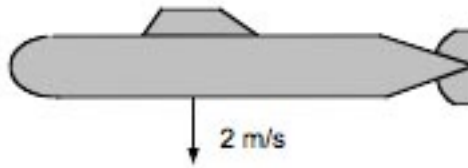
A **P = F** and **W > R**

C **P = F** and **W = R**

B **P = F** and **W < R**

D **P > F** and **W = R**

7. A small submarine of mass 1000 kg sinks in water with a uniform speed of 2 ms^{-1} .



What is the resultant force acting on the submarine?

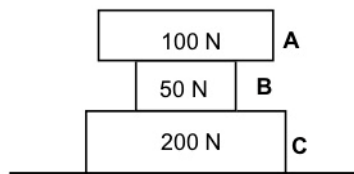
A 0 N

C 1000 N upwards

B 2000 N downwards

D 2000 N upwards

8. The diagram shows three boxes, **A**, **B**, and **C** resting on the floor. The weight of each box is as indicated.



What is the resultant force acting on **B**?

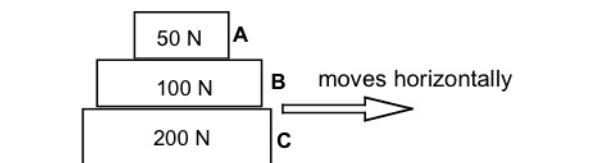
A 0 N

B 50 N

C 100 N

D 150 N

9. The diagram shows three boxes, **A**, **B** and **C** being moved across the floor horizontally. The weight of each box is as indicated.



What is the vertical resultant force acting on box **C**?

A 0 N

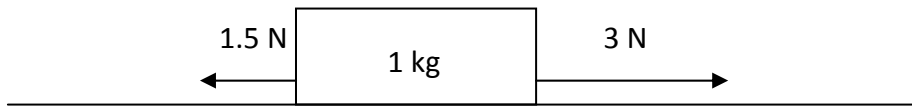
B 50 N

C 100 N

D 350 N

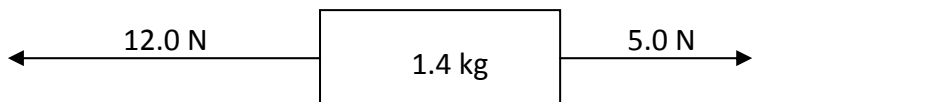
B. STRUCTURED QUESTIONS [15 marks]

10. In the following diagram, a force of 3 N is applied to a book, of mass 1 kg, resting on a table. The frictional force on the table is 1.5 N.



- a. Find the resultant force acting on the book. [1]
- b. Find the acceleration of the book. [2]
11. A metal block of 10 kg is being pushed across a table by a force of 30 N.
- a. Calculate the acceleration of the block. [2]
- b. Given that the actual acceleration of the block is only 2 ms^{-2} , calculate
- i. the actual resultant force acting on the block [1]
- ii. the frictional force acting on the block. [1]

12. An object of mass 1.4 kg rests on a horizontal surface, as shown in the figure below.

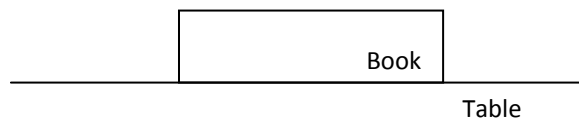


The object is pulled to the left by a force of 12.0 N, and a force of 5.0 N to the right. Assuming no other horizontal forces act on the object, calculate:

- i. the resultant acceleration of the block. [2]
- In practice, the block accelerates from rest and reaches a speed of 8.0 ms^{-1} in 2.0 seconds.
- ii. Calculate the actual acceleration and comment on your answer. [2]

13. A book of mass 2.5 kg is resting on a rough table.

- a. Draw and label the forces acting on the book in the following diagram. [2]



- b. The book is now pushed across the table by a force of 10.0 N. Given that the book is moving at a constant speed of 2.0 ms^{-1} , state the frictional force between the book and the table and explain your answer [2]

CHALLENGE YOURSELF! [8 marks]

14. A block of wood, of mass 1.0 kg, is pulled across a rough table surface by a force F of 3.0 N, at a constant velocity of 12 ms^{-1} . The force F is now removed after 5.0 s.

- a. State the value of the frictional force. [1]
- b. Describe the motion of the block, when F is removed. [1]
- c. Calculate the deceleration of the block. [2]
- d. Hence, calculate how long it takes to come to a stop. [2]
- e. Sketch the velocity time graph of the block. [2]